

Translation of Annexes to the IPER

Amended pages 1, 1a, 2:

5 **Description**

Method for Safely Coupling an External Voltage Network to an Operating Voltage Network and Circuit Arrangement for Carrying out Said Method

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The invention relates to a method for safely coupling an external voltage network to an operating voltage network, in particular of a motor vehicle, and to a circuit arrangement for carrying out said method.

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In coupling two voltage networks with each other, care is to be taken that the two voltages are compatible. The parameters of the voltages are their value, their polarity in case of dc voltage and the frequency as well as the phase in case of ac voltage. If there are two voltage networks coupled with each other in which these characteristics are not in conformity, damage in

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the voltage networks or failure in operation may result.

To avoid damage, it is known to connect fuses in the current path which separate the connection between the voltage networks in case of inadmissibly high current. However, such fuses do not provide protection against

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too high voltages.

In case of motor vehicles, there is the additional difficulty that different voltage levels will be utilized in the future in the on-board networks of motor vehicles. This constitutes a problem in particular if, in case of failure of the

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battery of a motor vehicle, a jumper operation is carried out by connecting the on-board network to the on-board network of another vehicle, since there is the risk in that event that different on-board networks are interconnected.

35 The document DE-A-197 19 919 discloses a method for safely coupling an external voltage network to an operating voltage network, in particular of a motor vehicle, in which at least one controllable switch is arranged between the operating voltage network and a connecting terminal, the at least one controllable switch is connected to a control unit, the connecting terminal is
40 designed for connection of the external voltage network and the method comprises the followings steps:

Measuring the polarity at the connecting terminal and examining whether the voltage is not in excess of a threshold value. If the measurement volt-
45 age is not within the permissible range, the controllable switch is opened. The current flowing between connecting terminal and operating voltage network is then measured and it is examined whether the current is not below a lower threshold value. If the current intensity is outside the permissible range, the controllable switch is opened.

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A similar method is known from DE-A-197 02 116.

In the prior art according to the two documents mentioned above, it is tolerated, for example in case of wrong polarization, that there is a high balancing current flowing first. This has the afore-mentioned effect of causing
55 possible damage.

It is an object of the invention to indicate a method that ensures safe coupling of an external voltage network to an operating voltage network, in particular of a motor vehicle, such that damage to the voltage networks is prevented. According to the invention, this object is met by a method having the features indicated in claim 1.
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A suitable circuit arrangement for the method is indicated in claim 8.

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The method is advantageous since damage to one of the voltage networks by excess current or overvoltage is prevented on the one hand, while the end of a balancing operation between the networks is recognized as well on

the other hand, namely when the current drops below a preset threshold
70 value.

Furthermore, it is advantageous that a permissible voltage range may be preset within which the voltage of the external voltage network may reside.

75 It is particularly advantageous that no parts, such as e.g. fuses, have to be replaced upon occurrence of an error. Locking after opening of the switch...

(... is advantageous since uncontrolled re-activation of the controllable
80 switch is thus prevented.)

85 **Note:** the passage in parentheses is not part of amended page 2, but indi-
cates the English text that was not amended in this paragraph)